1. Record Nr. UNINA9910746963103321

Titolo	Phase Separation in Living Cells : Benefits and Risks / / edited by Riki Kurokawa
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2023
ISBN	981-9948-86-X
Edizione	[1st ed. 2023.]
Descrizione fisica	1 online resource (309 pages) : illustrations (black and white, and color)
Altri autori (Persone)	KurokawaRiki
Disciplina	571.65
Soggetti	Molecular biology Biophysics Medicine - Research Biology - Research Cytology Biochemistry Non-coding RNA Molecular Biology Biomedical Research Cell Biology Non-coding RNAs
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Chapter 1. FUS aggregation by shear stress on pipetting and its suppression by non-coding RNA -- Chapter 2. Basics and recent advances in computational and theoretical methods for understanding the liquid-liquid phase separation -- Chapter 3.Promotion of liquid-liquid phase separation by G-quadruplex DNA and RNA -- Chapter 4. Phase regulation by chaperons -- Chapter 5. Regulation of aggregation of intrinsically disordered protein through phase separation: Risk management of phase separation -- Chapter 6. Molecular mechanisms of phase transition/separation of protein low-complexity sequences -- Chapter 7. Winding and Tangling. An Initial Phase of Membrane-less Organelle Formation (from a viewpoint of Cajal Bodies) -- Chapter 8. Formation and function of phase separated nuclear bodies directed by

architectural noncoding RNA -- Chapter 9. Force-dependent remodeling of cell-to-cell adhesion through the regulation of phase separation -- Chapter 10. Neuronal RNA granules: Phase separation, dynamics, and higher brain functions -- Chapter 11. Liquid-liquid phase separation in structure and function of nuclear pore complex -- Chapter 12. Phase Separation Orchestrates Cancer Signaling: Biomolecular condensates as a promising target for cancer therapy -- Chapter 13. Regulatory interaction of intrinsically disordered regions of pathogenic proteins in neurodegenerative diseases -- Chapter 14. Functional properties of phase separation and intranuclear complex of FUS in the pathogenesis of ALS/FTLD -- Chapter 15. Functional responses of microglia to amyloid plaques -- Chapter 16. Emerging role of phage separation in COVID-19.

Sommario/riassunto

This book presents the latest cutting-edge research on phase separation. It discusses the benefits and risks of phase separation for living cells from the perspectives of physics, chemistry, biology, and medicine. Phase separation is a physico-chemical process that induces a single solution of solvent and intrinsically disordered proteins (IDPs) to separate into two phases, one phase containing only solvent and the other containing IDPs in the solvent. A key molecule in phase separation is the intrinsically disordered region (IDR) proteins (IDPs), mostly comprised of RNA-binding proteins (RBPs). One of the major roles of phase separation is to generate condensates, membrane-less organelles including stress granule, Cajal body, and nucleolus. Biological actions of phase separation in various aspects of science have received increasing attention in recent years. The book consists of four parts; Part I on physics and chemistry includes topics on structural biology of RBP FUS/TLS and chaperone for phase separation, computational approach of phase separation, and chemistry of G-quadruplex of DNA and RNA. Part II on molecular biology presents molecular mechanism of IDR sequence phase separation and potential cellular function of these labile fibers, formation of membrane-less organelles, and roles of noncoding RNAs in phase separation. Part III on biology covers topics from nuclear pore complex, developmental biology regarding force-dependent remodeling, and neurobiology and higher order brain functions. Finally, Part IV on medicine presents condensates and cancer therapy, pathogenesis of neurodegenerative diseases based on IDPs, and responses of microglia to amyloid. The last chapter highlights the latest topic on how the SARS-Cov-2 virus takes advantage of phase separation for its infections. This book brings together the studies of phase separation in each area in a single volume. The comprehensive approach provides new insights to the research and will benefit the readers by responding to the emerging needs for understanding phase separation.